Docket No. 23623-7076
GC 541-3-D1

Certificate of Mailing/Transmission (37 C.F.R. § 1.8(a))

[X] Pursuant to 37 C.F.R. § 1.8, I hereby certify that this paper and all enclosures are being deposited with the United States Postal Service as first class mail on the date indicated below in an envelope addressed to the Assistant Commissioner for Patents, Washington D.C. 20231.

[ ] Pursuant to 37 C.F.R. § 1.6(d), I hereby certify that this paper and all enclosures are being sent via facsimile on the date indicated below to the attention of Examiner_____ at Facsimile No._____ at _____ a.m./p.m.

Dated: April 26, 2002

Name of Person Certifying: Nancy Hine
Printed Name: Nancy Hine

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	J. Bryan Jones, et al.	Assignee:	Not Yet Assigned
Filing Date:	February 1, 2002	Examiner:	Not Yet Assigned
Serial No.:	10/062,970	Group Art Unit:	Not Yet Assigned
Title:	**CHEMICALLY MODIFIED PROTEINS WITH A CARBOHYDRATE MOIETY**		

Assistant Commissioner for Patents
Washington, D.C. 20231

INFORMATION DISCLOSURE STATEMENT

Sir:

In accordance with 37 C.F.R. § 1.56, the references listed on the attached Form PTO-1449 are being brought to the attention of the Examiner for consideration in connection with the examination of the above-identified patent application.

I. Timing of the Information Disclosure Statement:

This Information Disclosure Statement is filed:

☐ With the new patent application submitted herewith (37 C.F.R. § 1.97(a)).

☒ Within three months after the filing date of the application or within three months after the date of entry of the national stage of a PCT application as set forth in 37 C.F.R. § 1.491.

☐ Before the mailing date of a first Office action on the merits. In the event, however, that an Office Action has crossed in the mail with this Information Disclosure Statement, no fee will be due if the certification is checked below. Otherwise, the Commissioner is hereby authorized to charge Deposit Account No. [ ] for any fees required pursuant to 37 C.F.R. §§ 1.17(p).

This Information Disclosure Statement is filed:

☐ After the first Office Action and more than three months after the application's filing date; or PCT national stage date of entry filing but, as far as is known to the undersigned, prior to the mailing date of either a final rejection or a notice of allowance, whichever occurs first, and the Commissioner is hereby authorized to charge Deposit Account No.50-1193 for the fee ($180) set forth in 37 C.F.R. § 1.17(p) and any additional required fees.

This Information Disclosure Statement is filed:

☐ After the mailing date of either a final rejection or a notice of allowance, whichever occurred first, and is accompanied by the fee ($180.00) set forth in 37 C.F.R. § 1.17(i)(1) and a certification as specified in 37 C.F.R. § 1.97(e), as checked below. This document is to be considered as a petition requesting consideration of the Information Disclosure Statement.

The undersigned certifies that:

☐ Each item of information contained in the Information Disclosure Statement was cited in a communication mailed from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this information disclosure statement.

☐ No item of information contained in this information disclosure statement was cited in a communication mailed from a foreign patent office in a counterpart foreign application or, to the knowledge of the undersigned after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of this Information Disclosure Statement.

II. Copies of the Cited Items:

☐ Copies of all of the items listed on the attached Form PTO-1449 are enclosed.

☐ Copies of only the following items listed on the attached Form PTO-1449 are enclosed: _____.

☒ Copies of those items which are marked with an asterisk (*) in the attached Form PTO-1499 are not supplied because they were previously cited by or submitted to the Patent Office in a prior Application No. 09/347,029 filed July 2, 1999 and relied upon in this application for an earlier filing date under 35 U.S.C § 120. See 37 C.F.R. § 1.98(d).

☒ Copies of those items which are marked with a double asterisk (**) in the attached Form PTO-1499 were cited in a foreign examination report in a related case. A copy of the search report and the cited references not already of record in this application are attached hereto.

III. Concise Explanation of Relevance:

☐ A concise explanation of relevance of the items listed on Form PTO-1449 is not given.

☒ A concise explanation of relevance of the items listed on Form PTO-1449 and marked with a double asterisk (**) is in the form of an English language copy of a Search Report from a foreign patent office, issued in a counterpart application, which refers to the relevant portions of the references (copy attached).

IV. Conclusion:

Citation of the above documents shall not be construed as:

1. an admission that the documents are necessarily prior art with respect to the instant invention;
2. a representation that a search has been made, other than as described above; or
3. an admission that the information cited herein is, or is considered to be, material to patentability as defined in § 1.56(b).

It is respectfully requested that the Examiner indicate consideration of the cited references by returning a copy of the attached form PTO 1449 with initials or other appropriate marks.

The Commissioner is hereby authorized to charge Deposit Account No. 50-1193 Docket No. 23623-7076 for any additional fees required in connection with the filing of this Information Disclosure Statement.

DATE: April 26, 2002

Respectfully submitted,

By: Michael J. Shuster

Michael J. Shuster, Ph.D.
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U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Use several sheets if necessary)

(PTO-1449)

ATTY. DOCKET NO.	SERIAL NO.
23623-7076	10/062,970
APPLICANT: Genencor International	
FILING DATE: 02/01/02	GROUP ART UNIT: Not Assigned

REFERENCE DESIGNATION **U.S. PATENT DOCUMENTS**

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	Class	Subclass	Filing Date If Appropriate
	A1 *	5,403,737	04/04/95	Abrahmsen et al.			
	A2 *	5,629,173	05/13/97	Abrahmsen et al.			
	A3 *	5,316,935	05/31/94	Arnold et al.			
	A4 *	5,208,158	05/04/93	Bech et al.			
	A5 *	5,244,791	09/14/93	Estell			
	A6 *	5,316,941	05/31/94	Estell et al.			
	A7 */**	5,955,340	09/21/99	Bott et al.			
	A8	5,340,735	08/23/94	Christianson et al.			

FOREIGN PATENT DOCUMENTS

EXAMINER INITIAL		DOCUMENT NUMBER	DATE	COUNTRY	CLASS	Subclass	TRANSLATION
	B1 *	EP 3 328 229 A1		EP			
	B2 *	WO 91/16423	04/18/91	PCT			
	B3 *	WO 96/27671	02/27/96	PCT			
	B4 *	WO 97/37007	10/09/97	PCT			
	B5 *	WO 98/23732	06/04/98	PCT			
	B6 */**	WO 99/20723	04/29/99	PCT			
	B7 */**	WO 99/37323	07/29/99	PCT			
	B8 */**	WO 99/37324	07/29/99	PCT			
	B9 */**	WO 00/01712	01/13/00	PCT			

OTHER DOCUMENTS (including Author, Title, Date, Pertinent Pages, Etc.)

	C1 *	Bech et al., "Significance of Hydrophobic S_4-P_4 Interactions in Subtilisin 309 from *Bacillus lentus*," Biochemistry, 32:2847-2852 (1993)
	C2 */**	Bech, L.M., et al., "Chemical Modifications of a Cysteinyl Residue Introduced in the Binding Site of Carboxypeptidase Y by Site-Directed Mutagenesis," Carlsberg Research Communications, (1988) vol 53, pgs 381-393, XP002063095
	C3 *	Bergland, P., et al., "Chemical Modification of Cystein Mutants of Subtilisin Bacillus Lentus Can Create Better Catalysts Than the Wild-Type Enzyme," J. Am. Chem. Soc., 119:5265-5266 (1997)
	C4 *	Berglund et al., "Altering the Specificity of Subtilisin *B. Lentus* by Combining Site-Directed Mutagenesis and Chemical Modification," Bioorganic & Mechanical Chemistry Letters, 6:2507-2512 (1996)

EXAMINER	DATE CONSIDERED

EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609; Draw line through citation if not in conformance *and* not considered. Include copy of this form with next communication to Applicant(s).

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Genencor International	
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02/01/02	Not Assigned

OTHER DOCUMENTS (including Author, Title, Date, Pertinent Pages, Etc.)

	C5 *	Betzel et al., "Crystal Structure of the Alkaline Proteinase Savinase™ from *Bacillus lentus* at 1 4 Å Resolution," J. Mol. Biol., 223:427-445(1992)
	C6 *	Bonneau et al., "Alteration of the Specificity of Subtilisin BPN' by Site-Directed Mutagenesis in its S_1 and S_1' Binding Sites," J. Am. Chem. Soc., 113:1026-30 (1991)
	C7 *	Brocklehurst, "Specific Covalent Modification of Thiols: Applications in the Study of Enzymes and Other Biomolecules," Int. J. Biochem., 10:259-274 (1979)
	C8 *	Bruice *et al.*, "Novel Alkyl Alkanethiolsulfonate Sulfhydryl Reagents. Modification of Derivatives of L-Cysteine," Journal of Protein Chemistry, 1:47-58 (1982)
	C9 *	Chen et al., "Probing the S-1' Subsite Selectivity of an Industrial Alkaline Protease in Anhydrous t-Butanol," Bioorganic & Medicinal Chemistry Letters, 3(4):727-33 (1993)
	C10*	Davies et al., "A Semisynthetic Metalloenzyme Based on a Protein Cavity That Catalyzes the Enantiosleective Hydrolysis of Ester and Amide Substrates," J. Am. Chem. Soc., 119:11643-11652 (1997)
	C11*/**	Davis, B.G., et al., "Altering the specificity of subtilisin Bacillus lentus through the introduction of positive charge at single amino acid sites," Bioorganic and Medicinal Chemistry, (1999 Nov.) 7 (11) 2303-11, XP0000892841
	C12*/**	Davis, B.G., et al., "Controlled site selective glycosylation of proteins by a combined site directed mutagenesis and chemical modification approach," J. Org., Chem., Vol. 63, (1998), pp. 9614-9615, XP002135378
	C13*/**	Davis, B.G., et al., "Controlled site selective protein glycosilation for precise glycan structure catalytic activity relationships," Bioorganic & Medicinal Chemistry, 8, 1527-1535, (2000), XP000986502
	C14*/**	Davis, B. G., et al., "Glycomethanethiosulfonates: powerful reagents for protein glycosylation," Tetrahedron: Asymmetry, NL, Elsevier Science Publishers, Amsterdam, 11:1, 245-262 (2000-01), XP004191784
	C15*/**	Davis, B.G., et al., "The controlled introduction of multiple negative charge at single amino acid sites in subtilisin bacillus lentus," Bioorganic and Medicinal Chemistry, (1999 Nov.) 7 (11) 2293-301, XP0000892840
	C16*	DeSantis et al., "Chemical Modifications at a Single Site Can Induce Significant Shifts in the pH Profiles of a Serine Protease," J. Am Chem. Soc., 120:8582-8586 (1998)
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	C18*/**	Desantis, G., et al, "Probing the altered specificity and catalytic properties of mutant subtilisin chemically modified at position S156C and S166C in the S1 pocket," Bioorganic and Medicinal Chemistry, (1997) 7/7 (1381-1387), XP0000892843
	C19*	Dickman, M., et al., "Chemically modified mutants of subtilisin bacillus lentus catalyze transesterification reactions better than wild type," Tetrahedron Asymmetry, (11. Dec. 1998) 9/23 4099-4102

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	C20 *	Gron et al., "A Highly Active and Oxidation-Resistant Subtilisin-Like Enzyme Produced by a Combination of Site-Directed Mutagenesis and Chemical Modification," Eur. J. Biochem., 194:897-901 (1990)
	C21 *,**	International Search Report, mailed July 21, 2000 from corresponding PCT US99/30362
	C22 *,**	International Search Report, mailed March 20, 2000, from corresponding PCT US99/15138
	C23 *,**	International Search Report, mailed July 10, 2001, from corresponding PCT US00/10988
	C24 *	Kaiser, "Catalytic Activity of Enzymes Altered at Their Active Sites," Agnew. Chem. Int. Ed. Engl., 27-913-922 (1988)
	C25 *	Kawase et al., "Effect of Chemical Modification of Tyrosine Residues on Activities of Bacterial Lipase," Journal of Fermentation and Bioengineering, 72:317-319 (1991)
	C26 *	Kenyon et al., "Novel Sulfhydryl Reagents," Methods Enzymol., 47:407-430 (1977)
	C27 *	Kluger et al., "Amino Group Reactions of the Sulfhydryl Reagent Methyl Methanesulfonothioate. Inactivation of D-3-hydroxybutyrate Dehydrogenase and Reaction with Amines in Water," Can. J. Biochem., 58:629-632 (1980)
	C28 *,**	Lloyd, R.C, et al., "Site selective glycosilation of subtilisin bacillus lentus causes dramatic increase in esterase activity," Biorganic & Medicinal Chemistry, 8, 1537-1544 (2000), XP000986506
	C29 *	Lo, Bryan, et al., "Replacement of Ala-166 with Cysteine in the HighAffinity Rabbit SodiumBlucose Transporter Alters Transpoert Kinetics and Allows Methanethiosulfonate Ethylamine to Inhibit Transporter Function," The Journal of Biological Chemistry, 273:2 903-909 (1998)
	C30 *	Neet, K.E. and Koshland, D.E., "The Conversion of Serine at the Active Site of Subtilisin to Cysteine: A 'Chemical Mutation,'" Proc. Nat. Acad. Sci. USA, 56(5):1606-1611.
	C31 *	Nishimura et al., "Reversible Modification of the Sulfhydryl Groups of *Escherichia coli* Succinic Thiokinase with Methanethiolating Reagents, 5,5'-Dithio-bis(2-Nitrobenzoic Acid), p-Hydroxymercuribenzoate, and Ethylmercurithiosalicylate," Archives of Biochemistry and Biophysics, 170:461-467 (1975)
	C32 *	Paulson, J.C., "Glycoproteins: what are the sugar chains for?" TIBS, 14:272-276 (1989)
	C33 *	Planas et al., "Reengineering the Catalytic Lysine of Aspartate Aminotransferase by Chemical Elaboration of a Genetically Introduced Cysteine," Biochemistry, 30:8268-8276 (1991)
	C34 *,**	Plettner et al., "A Combinatorial Approach to Chemical Modification of Subtilisin *Bacillus lentus*," Bioorganic & Medicinal Chemistry Letters, 8:2291-2296 (1998), XP004138220
	C35 *,**	Plettner, E., et al., "Modulation of Esterase and Amidase Activity of Subtilisin Bacillus Lentus by Chemical Modification of Cysteine Mutants," Journal of the American Chemical Society, (2 Jun. 1999) 121/21, 4977-4981, XPO000891274.
	C36 *	Polgar et al., "A New Enzyme Containing a Synthetically Formed Active Site. Thiol-Subtilisin," Journal of American Chemical Society, 88:3153-3154 (1966)
	C37 *	Ramachandran et al., "Stabilization of Barstar by Chemical Modification of the Buried Cysteines," Biochemistry, 35:8776-8785 (1996)

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	C38 *	Roberts et al., "Reactivity of Small Thiolate Anions and Cysteine-25 in Papain Toward Methyl Methanethiosulfonate," Biochemistry, 25:5595-5601 (1986)
	C39 *	Siddiqui et al, "Arthrobacter D-Xylose Isomerase: Chemical Modification of Carboxy Groups and Protein Engineering Of pH Optimum," Biochem. J., 295:685-691 (1993)
	C40 *	Smith et al., "An Engineered Change in Substrate Specificity of Ribulosebisphosphate Carboxylase/Oxygenase," The Journal of Biological Chemistry, 265:1243-1245 (1990)
	C41 *	Smith et al., "Chemical Modification of Active Site Residues in γ-Glutamyl Transpeptidase," The Journal of Biological Chemistry, 270:12476-12480 (1995)
	C42 *	Smith et al., "Restoration of Activity to Catalytically Deficient Mutants of Ribulosebisphosphate Carboxylase/Oxygenase by Aminoethylation," The Journal of Biological Chemistry, 263:4921-4925 (1988)
	C43 *	Smith et al., "Simple Alkanethiol Groups for Temporary Blocking of Sulfhydryl Groups of Enzymes," Biochemistry, 14:766-771 (1975)
	C44 *	Smith et al., "Subtle Alteration of the Active Site of Ribulose Bisphosphate Carboxylase/Oxygenase by Concerted Site-Directed Mutagenesis and Chemical Modification," Biochemical and Biophysical Research Communications, 152:579-584 (1988)
	C45 */**	Spura, Armin, et al., "Probing the Agonist Domain of the Nicotinic Acetylcholine Receptor by Cysteine Scanning Mutagenesis Reveals Residues in Proximity to the α-Bungarotoxin Binding Site," Biochemistry, 38:4912-4921 (1999)
	C46 *	Stewart et al., "Catalytic Oxidation of Dithiols by a Semisynthetic Enzyme," J. Am. Chem. Soc., 108:3480-3483 (1986)
	C47 *	Valenzuela et al., "Kinetic Properties of Succinylated and Ethylenediamine-Amidated δ-Chymotrypsins," Biochim. Biophys. Acta, 250:538-548 (1971)
	C48 *	West et al., "Enzymes as Synthetic Catalysts: Mechanistic and Active-Site Considerations of Natural and Modified Chymotrypsin," J. Am. Chem. Soc., 112:5313-5320 (1990)
	C49 *	White et al., "Sequential Site-Directed Mutagenesis and Chemical Modification to Convert the Active Site Arginine 292 Of Aspartate Aminotransferase to Homoarginine," Journal of the American Chemical Society, 114:292-293 (1992)
	C50 *	Wynn et al., "Chemical Modification of Protein Thiols: Formation of Mixed Disulfides," Methods in Enzymology, 251:351-356 (1995)
	C51 *	Wynn et al., "Comparison of Straight Chain and Cyclic Unnatural Amino Acids Embedded in the Core of Staphylococcal Nuclease," Protein Science, 6:1621-1626 (1997)
	C52 *	Wynn et al., "Mobile Unnatural Amino Acid Side Chains in the Core of Staphylococcal Nuclease," Protein Science, 5:1026-1031 (1996)
	C53 *	Wynn et al., "Unnatural Amino Acid Packing Mutants of *Escherichia Coli* Thioredoxin Produced by Combined Mutagenesis/Chemical Modification Techniques," Protein Science, 2:395-403 (1993)

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